CLAIMS

We claim:

1. A method for obtaining wood-cell attributes from cellulose containing samples, comprising the steps of:

radiating a cellulose containing sample with a beam of radiation, said radiation having an energy capable of passing through said sample;

collecting radiation attenuation information from said radiation which passes through said sample;

rotating said source relative to said sample;

repeating said collecting step after said rotating step, and

forming a projected image from said radiated attenuation information, said image including resolvable features of said sample.

2. The method of claim 1, further comprising the step of determining at least one cell dimension of said sample from said image.

3. The method of claim 2, wherein said at least one cell dimension is selected from the group consisting of cell wall thickness, cell diameter (length) and cell vacuole diameter.

4. The method of claim 1, wherein said image is a tomographical image.

5. The method of claim 1, wherein said sample is wood.

6. The method of claim 1, wherein said sample comprises a reconstituted wood product.

7. The method of claim 6, wherein said reconstituted wood product is at least one selected from the group consisting of strand board, fiber board and fiber-resin wood composite products.

8. The method of claim 1, wherein said resolvable features in said image are less than approximately 100 μm.

9. The method of claim 1, wherein said resolvable features in said image are less than approximately 20 μm.

10. The method of claim 1, wherein said resolvable features in said image are less than approximately 5 μm.

11. The method of claim 1, wherein said resolvable features in said image are less than approximately 2 μm.

12. The method of claim 1, said resolvable features in said image are less than approximately 1 μm.

13. The method of claim 1, wherein said image is a 3-dimensional image.

14. The method of claim 1, wherein said radiation is at least one selected from the group consisting of X-rays, gamma rays, neutrons, positrons and electrons.

15. A method for tomographically imaging features, comprising the steps of:

radiating a sample with a beam of radiation, said radiation having an energy capable of passing through said sample;

collecting radiation attenuation information from said radiation which passes through said sample;

rotating said source relative to said sample;

repeating said collecting step after said rotating step, and

forming a projected tomographical image from said radiated attenuation information, said tomographical image including resolvable features of said sample.

16. The method of claim 15, wherein said radiation is at least one selected from the group consisting of X-rays, gamma rays, neutrons, positrons and electrons.

17. The method of claim 15, wherein said sample is rotated while said source remains substantially fixed.

18. The method of claim 15, further comprising the step of positioning said source closer to said target than said target is to a detector used to form said image, wherein a spot size of said beam of radiation primarily determines the resolution provided by said image.

19. The method of claim 15, wherein said resolvable features in said image are less than approximately 100 μm.

20. The method of claim 15, wherein said resolvable features in said image are less than approximately 20 μm.

21. The method of claim 15, wherein said resolvable features in said image are less than approximately 5 μm.

22. The method of claim 15, wherein said resolvable features in said image are less than approximately 2 μm.

23. The method of claim 15, said resolvable features in said image are less than approximately 1 μm.

24. The method of claim 15, wherein said image is a 3-dimensional image.

25. A method for sorting cellulose containing products, comprising the steps of:

radiating a cellulose containing sample with a beam of radiation, said radiation having an energy capable of passing through said sample;

collecting radiation attenuation information from said radiation which passes through said sample;

rotating said source relative to said sample;

repeating said collecting step after said rotating step;

forming a projected tomographical image from said radiated attenuation information, said tomographical image including resolvable features of said sample, and

separating said sample into categories based on at least one resolvable feature derivable from said tomographical image.

26. The method of claim 25, further comprising the step of determining at least one cell dimension of said sample from said image.

27. The method of claim 26, wherein said at least one cell dimension is selected from the group consisting of cell wall thickness, cell diameter (length) and cell vacuole diameter.

28. The method of claim 25, wherein said cellulose containing sample is wood.

29. The method of claim 25, wherein said cellulose containing sample is a reconstituted wood product.

30. The method of claim 29, wherein said reconstituted wood product is at least one selected from the group consisting of strand board, fiber board and fiber-resin wood composite products.

31. The method of claim 25, wherein said resolvable features in said image are less than approximately 100 μm.

32. The method of claim 25, wherein said resolvable features in said image are less than approximately 20 μm.

33. The method of claim 25, wherein said resolvable features in said image are less than approximately 5 μm.

34. The method of claim 25, wherein said resolvable features in said image are less than approximately 2 μm.

35. The method of claim 25, said resolvable features in said image are less than approximately 1 μm.

36. The method of claim 25, wherein said image is a 3-dimensional image.

37. The method of claim 25, wherein said radiation is at least one selected from the group consisting of X-rays, gamma rays, neutrons, positrons and electrons.

38. A method for detecting wood destroying insect damage, comprising the steps of:

radiating a cellulose containing sample with a beam of radiation, said

radiation having an energy capable of passing through said sample;

collecting radiation attenuation information from said radiation which passes through said sample;

rotating said source relative to said sample;

repeating said collecting step after said rotating step;

forming a projected tomographical image from said radiated attenuation information, and

determining whether said sample includes said wood destroying insect damage from said image.

39. The method of claim 38, wherein said wood destroying insect damage is from a termite.

40. The method of claim 38, wherein said cellulose containing sample is wood.

41. The method of claim 38, wherein said sample is a reconstituted wood product.

42. The method of claim 39, wherein said reconstituted wood product is at least one selected from the group consisting of strand board, fiber board and fiber-resin wood composite products.

43. The method of claim 38, wherein resolvable features in said image are less than approximately 100 μm.

44. The method of claim 38, said resolvable features in said image are less than approximately 1 μm.

45. The method of claim 38, wherein said image is a 3-dimensional image.

46. The method of claim 38, wherein said radiation is at least one selected from the group consisting of X-rays, gamma rays, neutrons, positrons and electrons.

47. A system for obtaining physical features from cellulose containing samples, comprising:

a radiation source for radiating a cellulose containing sample with a beam of radiation, said radiation having an energy capable of passing through said sample;

a radiation detector for collecting radiation attenuation information from said

radiation which passes through said sample, and

structure for rotating said source relative to said sample, wherein a projected tomographical image is formed from said radiated attenuation information, said tomographical image including resolvable features of said sample.

48. The system of claim 47, further comprising a structure for determining at least one cell dimension of said sample from said image.

49. The system of claim 47, wherein said at least one cell dimension is selected from the group consisting of cell wall thickness, cell diameter (length) and cell vacuole diameter.

50. The system of claim 48, wherein said cellulose containing sample is wood.

51. The system of claim 48, wherein said cellulose containing sample comprises a reconstituted wood product.

52. The system of claim 48, wherein said reconstituted wood product is at least one selected from the group consisting of strand board, fiber board and fiber-resin wood composite products.

53. The system of claim 48, wherein said system can resolve features in said image which are less than approximately 100 μm.

54. The system of claim 48, wherein said system can resolve features in said image which are less than approximately 20 μm.

55. The system of claim 47, wherein said system can resolve features in which said image are less than approximately 5 μm.

56. The system of claim 47, wherein said system can resolve features in said image which are less than approximately 2 μm.

57. The system of claim 47, wherein said system can resolve features in said image which are less than approximately 1 μm.

58. The system of claim 47, wherein said image is a 3-dimensional image.

59. The system of claim 47, wherein said radiation is at least one selected from the group consisting of X-rays, gamma rays, neutrons, positrons and electrons.

60. A system for tomographically imaging features, comprising:

a radiation source for radiating a sample with a beam of radiation, said radiation having an energy capable of passing through said sample;

a radiation detector for collecting radiation attenuation information from said radiation which passes through said sample;

structure for rotating said source relative to said sample, wherein a projected tomographical image is formed from said radiated attenuation information, said tomographical image including resolvable features of said sample.

61. The system of claim 60, wherein said system can resolve features in said image which are less than approximately 5 μm.

62. The system of claim 61, wherein said system can resolve features in said image which are less than approximately 2 μm.

63. The system of claim 60, said system can resolve features in said image which are less than approximately 1 μm.

64. The system of claim 60, wherein said image is a 3-dimensional image.

65. The system fo claim 60, wherein said radiation is at least one selected from the group consisting of X-rays, gamma rays, neutrons, positrons and electrons.

66. The system of claim 60, wherein a focal spot size of said radiation detector is less than approximately 10 μm.

67. The system of claim 60, wherein a focal spot size of said radiation detector is less than approximately 1 μm.

68. The system of claim 67, wherein said sample is closer to said radiation source than to said radiation detector.